PAHs in Norwegian smoked food

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Smoked salmon.

Introduction

The smoking process of food can generate different types of PAH that may be harmful for the consumer.

The EC Scientific Committee on Food (SCF) concluded in its opinion in 2002 that Benzo(a)pyrene could be used as a marker for the occurrence and effect of carcinogenic PAH in food. The limit value of BaP in the kind of food presented here is 5 µg/kg.

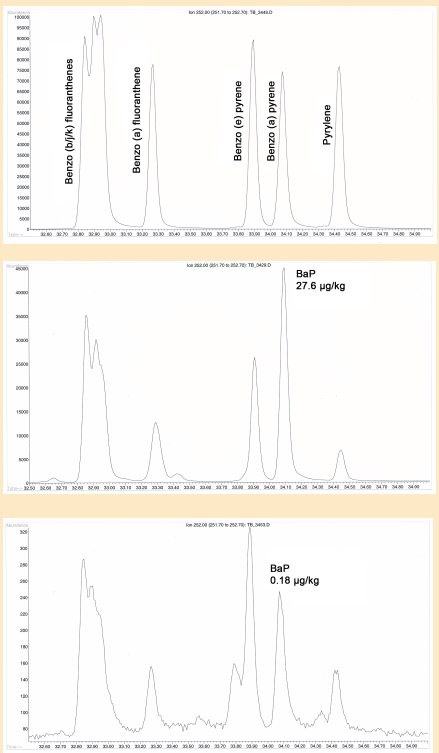
Furthermore SCF identified 14 other PAHs that possess both genotoxic and carcinogenic properties. In addition the joint FAO/WHO Expert Committee on Food Additives recommended in February 2005 to collect data also on 7-benzo(c)fluorene in food.

In this work, different types of smoked food were investigated for the suggested 16 PAHs. The sample set contained of products of fish and meat, prepared by local producers with different types of smokehouses and processes.

Smoked lamb.

Methods

Representative samples where taken from the smoked food products for analysis. Homogenisation of the samples was done with Na_2SO_4 prior to cold column extraction using a mixture of cyclohexane and ethyl acetate as solvent. The PAH where extracted from the lipid phase by the "Grimmer method". Final cleanup of the extracts were done by deactivated silica gel. The extracts were then concentrated and recovery standard was added prior to separation on a fused silica column and analysis using GC-LRMS in EI mode.



SIM chromatorgram for mass 252 from:
- calibration standard run
- high level smoked lamb sample
- low level smoked samlon sample

Results

In general the concentrations of PAH in the food items were relatively low, and only two out of the 72 samples contained BaP above the limit value set.

Smoked fish:

33 samples of fish were collected. The samples were of smoked mackerel, salmon and trout. The samples were from 19 different producers that had used several different smoking methods. None of the values found were above limit value of BaP.

Smoked meat:

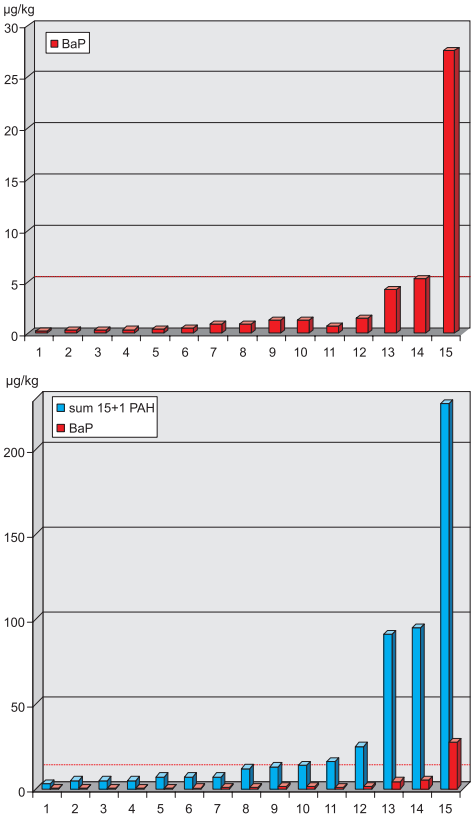
19 samples of smoked meat were collected, where 15 were smoked lamb. The samples were from 15 different producers.

The highest levels of the analysed PAHs were found in smoked lamb products. The total concentration of the analysed PAHs was almost 230 µg/kg, with BaP concentration of 28 µg/kg.

All the smoked lamb products had detectable levels of BaP, indicating that these products have somewhat elevated PAH levels compared to other products.

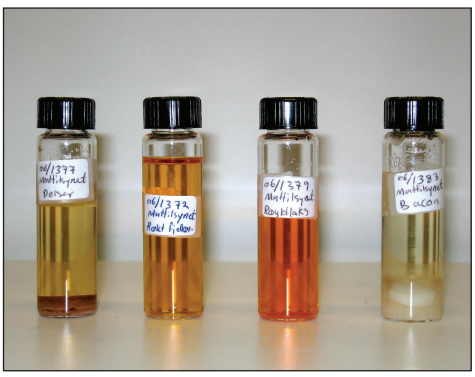
Mixed products

20 samples from 18 different producers were collected. In different smoked sausage products the levels were relatively low. Ten out of 20 samples were below detection limit and the highest concentration found was 2.6 µg/kg.



Results given in µg/kg.

Samples of different smoked fish.



Extracts of smoked food.

Acknowledgement

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